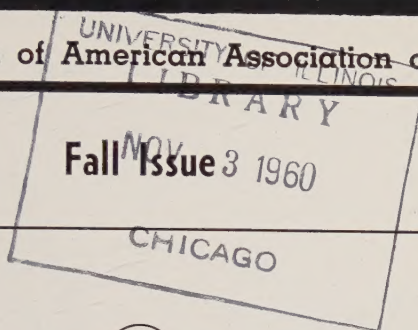


PROFESSIONAL ENGINEER

Official Publication of American Association of Engineers



Civic Consciousness

"Ask the Engineer—the Man Who Knows"

Engineering in the Tea Industry



**Transparent
Plastic
Drawing
Board**

New Precision Drawing Board

**Plastic drawing board that can be carried easily in
briefcase. Weighs less than 8 ounces**

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The American Association of Engineers

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M. E. McIVER, Editor

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ENGINEERING IN THE PRESS

ENGINEERS URGE BOULDER DAM BE RENAMED HOOVER

The American Association of Engineers at its annual convention at a South Michigan avenue, adopted a resolution that the name of the Hoover Dam should be changed to honor the late President Hoover.

ENGINEERS Social Aims Now Key To Study

CHICAGO, (U.P.)—Engineers are teaching the conclusion that—like members of the medical pro-

Army Engineers to Weigh Flood Plans Adv

Outlet Dredging and Chiefly By Aug Other Suggestio Lakes Area—A

ENGINEERS SUBMIT PROGRAM FOR THE CONTROL OF PUBLIC WORKS EXPEN

Any program so vast as that of Gov- economic considerations should be formulated by non-partisan Federal agency of the U. They are deserving but demands expert study and all possible safeguards against waste and abuses, is today con- d by most Americans. If it is inevitable that mistakes be made it is no less imperative that every effort be put forward toward applying remedies.

WIDER TRAINING FOR ENGINEERS

Business Against

Junking Men of Gets Severe Res Business Lea

ENGINEERS IN FICTION

MINING

WINE, DITZEL & "WEBSTER" MANE "SIBERIAN GOLD"

HARDER (JACK MILLARD) & HARDER "Y"

FOOT, MOSE, WADY (MILLOCK) "LED-WORD CLAIM"

ANDREWS, MARC MARY RICHMOND SHIP "COURAGE OF THE COMMERCE"

SMITH, FRANK, HOPKINSON "SCHEMER" "Y"

MORROW, MARC HONORE (MILLOCK) WILLISIE "Y"

GROUSE "Y"

SCRIBNER "Y"

SCRIBNER "Y"

HOUGHTON "Y"

APPLETON "Y"

SCRIBNER "Y"

ENGINEERING ON THE AIR



EXCERPTS FROM "CAVALCADE OF AMERICA"

Over a hundred years have passed since the Erie Canal was built. Great as it was in its day, it seems small in comparison with our modern triumphs. Yet taking with it the foundation of engineering in America.

I think American engineers can

The willingness to tackle any technical skill to master it... to see it through no matter these qualities build the tunnel.

There's no supposing in an engineering son.

Even to those who are unfamiliar with difficulties encountered in the construction of the tunnel stands out as an engineering of the highest order.

Much could be said of the engineering memory and honor of the engineer who also died both of whom might witness the day to the day and Milton H. W.

Our engineers to the world as the America.

Engineering in Advertising

ARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPI

Through this body of specialists, unique in the engineering world, Hartford continuously brings to business new ways, new ideas for old.

America

ing—yet it took a group of New York engineers to develop and perfect this almost frictionless seal point where it made possible far more efficient compressors capable of utilizing modern refrigeration and certain types of Air Conditioning.

UNITED STATES STEEL

United States Steel engineers operated with automotive designers. They developed and produced a sheet of steel so tough and produced a sheet of solid top—perhaps the largest stamping of its kind ever attempted—its surface is still faultlessly smooth, and ready for the finest finish.

It's policy has been to put not merely the best available material but also the inspiration, the genius, the skill of the men with whom this associates.

er ration onin.

ENGINEERS IN THE MOVIES



Composite of PROFESSIONAL ENGINEER's back-cover pages. A series designed to represent graphically the channels through which millions of ideas about engineers reach millions of men—advertisements, news-stories, radio, fiction, and the movies.

Civic Consciousness

Another activity of A.A.E. which we would like to review in this issue

"See your Dentist Twice a Year," "Consult your Doctor," are million dollar slogans. They have been put in circulation, not by the dentists and doctors themselves, but by life insurance companies, makers of chewing gum, manufacturers of dentifrices. If the affiliates of Engineering interested in the construction of good highways saw fit to develop the public's appreciation of the essentiality of good engineering in the planning, as well as in the construction of highways, they might in their own advertising popularize the slogan "Ask the Engineer."

To stimulate public service in the profession is and has always been a major aim of American Association of Engineers. Much of the Association's public service is to be credited to chapters, active in support of all worthwhile local civic agencies and initiators of many admirable projects: Accomplishments of the chapters are heralded in *PROFESSIONAL ENGINEER* in order that they may be emulated by other groups. Headquarters, in turn, encourages the chapters to promote the civic activities which the Association as a whole initiates or supports.

In the twenty odd years since A.A.E., in its history (1934), summarized its activities designed to promote public service in the profession, the Association has itself sponsored six major movements. The first was its "Get in Step" program, planned to familiarize engineers with the theory and practice of the "New Deal". The Association's "Civic Service Survey" followed, closely related to its "Ask the Engineer" campaign. In the early '40's, A.A.E. led the fight against bills introduced in Congress to "mobilize science and technology". During World War II, A.A.E.'s employment service gave unreserved support to government "manpower" agencies. A.A.E. spread before engineers plans published by governmental and private agencies for "demobilization of industry" and reconversion of a war economy to production of civilian goods. Throughout the period the Association campaigned vigorously for amendment of the Wagner Act to secure real freedom of association for engineers working closely with Senator Ball and other government personnel. In this brief article it is possible only to outline the nature and results of these activities. It will deal first with A.A.E. civic service through its chapters and their leaders; then it will sketch the major campaigns initiated by headquarters and supported by chapters.

In the "Civic Ace" series of articles in *PROFESSIONAL ENGINEER*, which put the spotlight on individuals who had made significant contributions to their communities, the Association gave credit to men who had earned such recognition, and at the same time described public service that other groups of engineers might emulate in their own communities. The first group of "Civic Ace" biographies appeared in *PROFESSIONAL ENGINEER* in April, 1940, and included stories of the civic activities of Vic I. Housholder of Phoenix, Arizona, Dorr E. Field, of Columbus, Mis-

Mississippi, David R. Shearer of Johnson City, Tennessee, and Charles D. Wailes, Jr. of Long Beach, California. All four have been identified with service clubs (with Rotary, Kiwanis, Exchange, and other groups). Three have made outstanding contributions to youth activities.

It is not possible to detail the public service performed by these men as they were described in PROFESSIONAL ENGINEER. They illustrated the kind of civic activity which A.A.E. sought to stimulate among engineers. In every chapter where civic service is a dynamic feature of the total program, there is a "civic ace" to see opportunities and pace the groups.

Phoenix Chapter has been fortunate in having Vic Housholder to spark its civic program and a score of men ready to use their special knowledge and talents in well planned projects. Its "Lemme Engineerit" column in the Phoenix Gazette was unique and valuable. The project was described briefly in PROFESSIONAL ENGINEER in the April, 1937, issue.

Under an attractive heading which combined the A.A.E. symbol with the distinctive caption "Lemme Engineerit" the chapter invited citizens to report problems and grievances, and promised to investigate and use its influence for amelioration or correction of whatever ills the Chapter found on investigation. The letters were published with the chapter's answer, showing what action had been taken. From time to time the column was reproduced in A.A.E.'s publication in order that other chapters might recognize the feasibility of the activity and institute a similar service in their communities.

In Washington, D. C., two "civic aces", Kenneth P. Armstrong and W. I. Swanton, worked through the A.A.E. Chapter for enfranchisement of residents of the District of Columbia.

Some of the chapters specialized in championship of conservation of natural resources. Peoria Chapter protested stream pollution and "engineering expediencies" in flood control projects which destroyed fish and wildlife. Henry Arnstein, the most outstanding champion of conservation through chemistry urged conversion of industrial waste into valuable commodities. World famed, he relayed his challenging discourses on the subject to the chapters for discussion and possible action.

All the activities described here briefly are considered typical of the civic service of A.A.E.'s individual members and chapters; it is not possible here even to tabulate, much less describe, the great variety of projects and achievements which deserve commendation.

Campaigns Initiated and Directed by Headquarters

In December, 1934, A.A.E. initiated its "Get in Step" campaign. The Association's Get in Step Committee planned a series of programs for chapters, with bibliographies, to clarify for engineers the whole "New Deal" program. These study outlines designed to give A.A.E. members definite, authoritative information on all the agencies set up by the national government, their purposes, their *modus operandi*, and their achievements.

to date. At that time people were blindly partisan, either unreservedly for or intransigently against the New Deal and everything it included or connoted. People expended more emotion than logic in their study of government theory and practice which seemed likely to re-shape many of our institutions and revise basic political and economic philosophies and traditions.

To A.A.E. one trend in the new order was unmistakable; this was the trend toward regimentation and the organization of minorities into pressure groups. The Association believed that engineering was peculiarly affected by the New Deal and, more than most citizens, responsible for carrying out the "plans" of its agencies. A.A.E. also believed that engineers would later bitterly repent their negligence if they failed to study and understand the New Deal and provide active leadership. Space does not permit even a summary of the material published in *PROFESSIONAL ENGINEER* in four successive issues beginning in December, 1934. Sample pages and the editorial which announced the project will be reproduced here.

In announcing its "Get in Step" plan, the Association said: "Every citizen is affected by it and all good citizens must accept some responsibility in the program it has initiated. No individual or group can any longer look upon the plan as unsubstantial or fantastic or idealistic. It is actual.

"Engineers must realize first that they are, perhaps more than other classes of workers affected by it . . . and therefore they must realize that their welfare as individuals in the new order depends upon their intelligent cooperation as a group. In other words, the members of this profession must "Get in Step" or wander aimlessly for at least two years. They must get in step with each other and as a group influence the general movement for the good of engineers and society, or remain an unclassified minority in dozens of different industries and enterprises affected by the many phases of the New Deal.

"This society recommends activity rather than passivity. Not a mere partisan championship of every project; not a group movement to the 'band wagon.' . . ."

The plan was well received and several issues of the magazines were devoted to the subject, with helpful suggestions, references, etc.

Daniel C. Roper, secretary of Commerce, U.S.A., at that time, was in accord with our plan, commenting as follows:

"Certainly never before in the history of this country have we needed so much as now to study the past, present and future. It is gratifying that this has become apparent to so many people and that we now have almost a nation-wide forum divided into, of course, many segments of study.

"I have profited very much in life from the study of the parable of the blind man and the elephant, to which you so effectively referred in this issue of the magazine. It is indeed difficult, yet it is impossible for any one man to see all segments of life at one time. He, therefore, needs to study the comprehensive problems in cooperation with others in order to make sure that he had gotten the correct perspective and secured the necessary knowledge. Furthermore, I find that we never reach any high points in satisfaction as to our contributions to life until we think in large and comprehensive terms. I, therefore, agree with you that our objectives should be to 'master the comprehensive plan.' This applies to all of life and to all of our relationships, including the New Deal."

Industry, too, were much in favor of our "Get in Step" plan and many industrialists complimented the Association on its stand. Alfred P. Sloan, Jr., then presi-

dent of General Motors Corporation, had this to say: "I believe your program is highly important. Any and every group, especially a group that is so equipped through experience and mentality, to deal with problems of this kind, should make the most effective contribution they can, in every way, to promote a better understanding of the facts and fallacies of what is being done. The trouble is, the public hears too much of one side of the equation."

In the September, 1936 issue of its official journal, A.A.E. announced its "Ask the Engineer—the Man Who Knows" campaign. When the magazine was streamlined in 1936 and converted into a sort of Reader's Digest, it was divided into three sections:

- Business Problem
- Public Relations
- Civic Responsibilities

In the "Civic Responsibilities" section A.A.E. briefed or quoted other sources which commemorated outstanding public service by engineers and also reported statements of non-engineers concerning the essentiality of sound engineering guidance in the planning as well as in the designing and construction of public works. These tributes to members of the profession were acknowledged by A.A.E.'s Ask the Engineer Committee in personal letters of commendation. The Public Relations Committee of the Whole sent in quantities of material. The slogan "Ask the Engineer—the Man Who Knows" was emblazoned on A.A.E. stationery, adjuring the public to get the utmost benefit from its engineer citizens.

In 1939, A.A.E. used novel tactics to induce more engineers to take an active part in civic affairs, and at the same time suggested to community leaders and service organizations the wisdom of "Asking the Engineer." This was the survey of engineering's civic status, published in the December, 1939 issue of PROFESSIONAL ENGINEER under the title, "The Engineer as Local Community Leaders See Him." A questionnaire was addressed to chambers of commerce, Lions, Kiwanis, and Rotary clubs throughout the nation. There were three general or master questions, each amplified by specific queries as to the part played by engineers in the civic affairs of the community. The three major leads were:

1. Is your community getting full value from its engineer citizens acting in groups?
2. Is your community getting full value from its engineer citizens individually?
3. Does your state, your county, your city use its engineers intelligently and fully?

Specific questions under each major head suggested the ways in which engineering societies and individual engineers should be useful to communities. The Association was, of course, genuinely interested in the replies—in getting the public's estimate of the extent and quality of engineers' participation in civic activities. The underlying motive, however, was to induce communities to expect and obtain greater civic service from their engineers; in other words, to "Ask the Engineer".

Ask the Engineer—The Man Who Knows!



"Going to town"... because the X-Ray System has already shown thousands that LaFayette has all of the vital engineering features that manufacturers leave out of their LOW-priced cars but

Americans know automobiles! And when Nash developed the X-Ray System so that car-wise Americans could see, with their own eyes, that LaFayette is the ONLY car in the lowest-price field that's engineered, powered, and lubricated exactly like the highest-priced cars—sales began to double and triple in cities and towns all over the country!

perfectly good on the outside but as you're protected you may be headed for a blow-out without knowing it. And that's why Goodrich engineers, in order to give motorists real blow-out protection, developed the Life-Saver Golden Guard—a layer of special rubber and full-length cords, scientifically treated to re-

research keeps the General Electric Refrigerator years ahead always—in all ways! The General Electric Company is the world's greatest storehouse of electrical knowledge. Its brilliant staff of scientists and engineers has developed and perfected many of the marvels of modern magic that have made living today easier and more pleasant. Out of their vast experience and wide research have come the great new General Electric Refrigerators for 1936.

Years before Ab Jenkins began his record-breaking run, Firestone chemists and engineers toiled in a ceaseless effort to find the way to conquer internal friction which creates heat—the great destroyer of tire life. From their efforts was conceived Gum-Dipping—the patented process which so skillfully blends cotton and rubber that every tiny fiber of every

and foreign automotive engineers. Why not make certain that you get the plugs preferred by engineers? Champions make every engine a better performing engine—12 years of racing supremacy prove that—and they are available everywhere.

BECAUSE this sensational Goodrich Kathanode Electro-Pak exceeds the Society of Automotive Engineers' battery starting requirements for standard types up to 105%, it will turn over your motor quickly and smoothly even in coldest weather; it will operate all your lights, signals, radio, heater at full efficiency.

You need one kind of power for quick starts, another for fast pickup and hill climbing, another for economical running.

Shell engineers now give you the gasoline that combines these different kinds of power in one fuel—Super-Shell, THE FIRST TRULY BALANCED GASOLINE.

EACH DAY America's 25 million cars average 30 stops... making $\frac{3}{4}$ of a billion in all. Each stop eats up gasoline... in starting, shifting, accelerating!

Accelerating alone, leading auto engineers say, can use up 60% more gasoline than steady running.

For economy in "stop-and-go" driving, your gasoline needs 3 kinds of power—just as your car needs, 3

It is natural enough that experienced motorists insist on a GENUINE Purolator when they have their oil filters renewed. They want the same filter that came on their car... the filter selected by the engineer that designed it... and 90% of all the filter-equipped cars that have left the factory during the past three years carried GENUINE Purolators.

STANDARD BUCK and BUS TIRE

THIS amazing new tire is designed by expert tire engineers and manufactured from first grade materials by skilled tire molders in the world's most efficient factories. Tremendous savings are made—in buying, because of Firestone's worldwide resources—then by volume production and economical distribution—

Such an identity is typical of Westinghouse enterprise over 50 years in many fields... requiring the utmost in engineering vision, large-scale manufacturing facilities and a constantly ripening experience. Westinghouse Electric & Manufacturing Company,

From that moment until now, Purolator has continued its leadership. Its engineering staff has devoted its entire time to filtration problems, and its filters have reflected the very latest word in oil cleaning effectiveness.

Best complete trucks of their type in the priced field, these new Studebaker forward trucks are heavy-duty tough and through. Big, 6-cylinder truck engines, sturdy full-floating rear axles, big hydraulic brakes, true truck frames and springs—and furthermore—a comfort-cab that's really been engineered for the job!

\$565
upward, chassis at the factory

So Long! . . . We'll See you in the Ads

Members of A.A.E.! Why not look through the daily press, your favorite magazines and see how many advertisements give credit to engineering talent. Watch TV and listen to the radio to see how the Engineer and his profession are depicted. Send in your findings to National Headquarters. Consider yourself a member of A.A.E.'s National Clipping Bureau. Boost the Engineer and his works.

Two typical replies to the first question follow: "From a civic standpoint, I believe the engineers are personal losers in that they are not taking advantage of the many opportunities to associate themselves with the other business men of the community in various civic projects from a technological standpoint."

"I do not believe that it could be said that professional engineers have been outstanding among the men who have been community leaders, and they do not as organizations aggressively interest themselves in campaigns for bond issues covering technological projects."

Answering question No. 2, one man had this to say: "In twenty-four years of semi-public activities, I have known many engineers. Most of them were very solid and substantial citizens, yet they, in great majority, showed no inclination toward leadership in community affairs. As a group they have been inarticulate . . . Of course there are outstanding exceptions, but these, in my own experience, have been so few that they merely emphasize the general condition of which I complain."

One aggressive Chamber of Commerce secretary incorporated this paragraph in his reply: "It may be probable that Chambers of Commerce have neglected this group that is, have not sought to encourage or promote getting together with engineers in a given territory in more or less organized groups for the purpose of acquaintanceship, exchange of ideas, etc."

A typical reply to question No. 3, follows: "To my mind no class of professional men can, in this machine age, be of greater assistance. In our State engineers are not to blame in most cases, but they are not used to the extent they should be."

Arousing the Interest of Engineers in National Issues

In the 40's several campaigns ran more or less concurrently. There was, of course, the campaign for protecting "freedom of association" and for amendment of the Wagner Act, discussed more fully in the section of this history entitled "Unity in the Profession."* In 1942 and 1943 A.A.E. alerted engineers to the dangers inherent in certain measures being considered by Congress to "mobilize science and technology", bills authored and sponsored by the late Senator Harvey Kilgore of West Virginia. Presented as "national defense" measures these measures, if enacted, could have brought about regimentation of engineers and engineering education in peace times. Several issues of the magazine were devoted to reports and analyses of these bills as their potentialities were revealed in hearings. The testimony of one witness, an ardent supporter of S-2721, is enough to indicate the threat to freedom of engineers. Waldemar Kempfer, Science Editor of the New York Times, in what was meant to be lavish praise of the bills, said:

"The only government in the world, I regret to state, that has used science, or intended to use science to secure social security, social happiness and contentment is Russia. . . . There you find science propagated on all fronts . . . Irrespective of whether there is any profit in it. The Soviet Academy of Sciences is an integral part of the government. . . . It plans the research activities of the entire country and those plans extend right down into every shop. . . . I hope that if it (S-2721) is approved by Congress and the President, I hope that it will not be just a wartime institution, but that it will become a permanent institution, because what should we destroy this elaborate apparatus which is bound to produce much

A CREDIT TO THE ENGINEERS OF TWO GREAT INDUSTRIES

Our Thanks

TO THE AUTOMOBILE
ENGINEERS WHO HAVE WORKED
WITH US TO MAKE POSSIBLE THIS
WORLD-FAMOUS SAFETY TIRE.

THE job of building the tires for many of America's fine cars, for years has kept U. S. Tire Engineers in constant contact with the men who have made history in motor car development.

Together they have worked—at the great motor proving grounds and laboratories—on test models of cars, and tires too. For no one knows better than the automobile designer that the car and its tires must be engineered as a unit, if the public is to receive all the brilliant performance—safely, smoothly, quietly—of which the vehicle is capable.

Through this cooperation between Car Engineer and U. S. Tire Engineer—better cars, year after year, have been matched with better tires—benefiting millions of car owners.

When you ride on U. S. Royals, it is doubly assuring to know that your tires are the last word in safety and efficiency—measuring up to the gruelling tests of the Automobile Engineer—passing the most exhaustive tests of the Tire Engineer.

It is significant that today's U. S. Royal—built for today's cars—still retains those fundamental "U. S." Safety Principles on which this famous tire's reputation for **SAFE MILEAGE** has been built—**COGWHEEL TREAD**—**SAFETY-BONDED BODY**—**TEMPERED RUBBER**.

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**E-TESTED...Thousands of Hours,
SAFE MILEAGE**



SAFETY TREAD..
COGWHEEL DESIGN,
world-famous for ex-
tra skid protection.



U.S. ROYAL TUBE...
patented air-venting
prevents trapped
air blowouts.

United States Rubber Company



SO LONG! . . . See You in the Ads . . .

Excerpts from an advertisement clipped from one of our leading popular magazines evidencing the employer's appreciation of the value of good engineering, used in our early survey on the subject. . . . "Ask the Engineer . . . the Man Who Knows!"

good, and then let ourselves drift along aimlessly as we have in the past?"

W. S. B. Lacey, chief of the foreign information service of the Office of Price Administration, testifying at the request of the Subcommittee on Technological Mobilization, explained how Germany's professional employees, and employers were incorporated with skilled labor in a "labor front" by the Nazis. He also explained that every worker was compelled to have a work book, without which he was ineligible for employment anywhere in Germany after March, 1936. The government thus established a file on all workers (professional and non-professional alike) which gave it all vital statistics and a vocational history of every man. These workers could be disposed as the government pleased wherever they were needed and at any type of work the Nazis designated. This was the kind of "mobilization" that could be developed through the vaguely phrased bills to "mobilize science and technology".

As leaders of government and industry began to be concerned about the problems that were likely to arise with the cessation of hostilities A.A.E., without attempting to evaluate the plans, published for information of its members the most definite and comprehensive proposals that were issued by agencies of government and industry. Everyone was afraid that a drop in employment during the anticipated "reconversion period" might develop into a down spiral and get completely out of control, plunging

BUFFALO manufactures complete lines of unit coolers, comfort conditioning cabinets, evaporative condensers, evaporative water coolers, air washers, unit heaters, and fans of all types—sells only thru our own engineering offices to contractors and industrials. • *Complete bulletins on any or all of the equipment listed above sent on request.*

What Every Engineer Knows—

Faulty design is more rare in industrial equipment now-a-days than ever before. When the new piece of equipment goes wrong on the job—more often than not, it's because the **WRONG** equipment was selected. That's why, even though we have equipment to **SELL**, we recommend that **ENGINEERS** outside our organization be asked to pass on our selection for your job. If their judgment coincides with ours, it's certain that you are going to be satisfied.

Ask a Consulting Engineer

Consulting Engineers have only one commodity for sale—their professional ability—their reputation, if you will. Because of their training, their experience, and their integrity, they have an important place in the selection of industrial and commercial cooling and air conditioning equipment. Why not make use of their services which guarantee you satisfaction?

BUFFALO FORGE COMPANY

501 BROADWAY

Branch Engineering Offices in Principal Cities

BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

**COOLING—HEATING
VENTILATING
AIR CONDITIONING**

An advertisement in line with our suggestion that engineers be consulted.

the country back into a depression (from which it had emerged only as defense production created employment opportunities for millions after 1939). In the June, 1942, issue of *PROFESSIONAL ENGINEER*, for example, A.A.E. reported the proposed "demobilization" plans of the following agencies and organizations: Official Government Program, stated by the National Resources Planning Board; Post-Defense Readjustments, outlined for the Chamber of Commerce of the United States by David C. Prince of General Electric Company; Recommendations of the 46th Congress of American Industry to the National Association of Manufacturers; report of Fortune Magazine's Round Table on Demobilization of the War Economy; A Congress of the Free Enterprise System, by Charles E. Wilson, President of General Electric Company.

American Association of Engineers has not presumed to think for its members. It has used a great many devices and techniques to stir their curiosity, stimulate their desire to serve, and to aid them in the first step in all engineering activities—to get the facts. In the following issue of *PROFESSIONAL ENGINEER* we will conclude the history of A.A.E.'s activities through 1959 by discussing Employment conditions and Remuneration.

About Accidents

Information from the Travelers Insurance Companies, Hartford, Conn., reveals that there were 900 more deaths and more than 50,000 additional injuries on U.S. highways in 1959 than was the case in 1958, according to statistics compiled by The Travelers Insurance Companies.

Fatalities climbed to 37,600 and more than 2,870,000 were injured as a result of automobile accidents.

The figures were released by Travelers in its annual highway safety booklet, entitled this year, "The Dishonor Roll." It was reported that more than 3,000,000 copies of the booklet are being distributed throughout the country.

In the report it was stated that more than 62,000,000 men, women and children have been killed or injured by automobiles since they first appeared on the scene. More have died on the highways than on our nation's battlefields. More have been injured than in all the world's wars combined.

By far the single biggest cause of accidents resulting in death or injury was speed. More than 43.1 percent of the deaths and 38.8 percent of the injuries were blamed on speed. Second biggest killer was the driver on the wrong side of the road who was blamed for 15.9 percent of the deaths.

Although making up less than 14 percent of the driving population, drivers under 25 years of age were involved in nearly 29 percent of the fatal accidents. There were 13,140 young drivers under 25 involved in fatal accidents during the year—2,010 were under age 18.

Civil Engineering

An interesting and informative record of civil engineering from the ancient world down to the present era is given by Hans Straub, in his book "A History of Civil Engineering," which is a translation from the German book "Die Geschichte der Bauingenieurkunst." The book is addressed to students and practicing engineers and is meant to give something of the historical background of science and art which should

widen the horizon and counteract professional narrow-mindedness.

It shows how modern construction technique and present-day civil engineering have gradually developed from widely divergent roots, namely the science of mechanics on the one hand, and the time-honored creative craft of building on the other. Copies may be obtained from the A.A.E. Book Department, 8 S. Michigan, Chicago. \$5.00 a copy.

Morris L. Cooke Dies

Morris Llewellyn Cooke, a consulting engineer who served the American Association of Engineers exceedingly well with its work on ethics in the earlier years, died recently at the age of 87.

Mr. Cooke was director of public works in Philadelphia from 1911 to 1915 and served under Governor Gifford Pinchot in 1923 as director of the Giant Power Survey Board. In 1935 he became the first administrator of the Rural Electrification Administration by appointment of President Franklin D. Roosevelt, serving through 1937.

In 1939 he was co-author with Philip Murray, then a vice president of the CIO, of a book "Organized Labor and Production."

George Havas

George Havas, general manager of the Heavy Construction Division and vice president of Henry J. Kaiser Company, has received the honorary degree of Doctor of Engineering from Rensselaer Polytechnic Institute. Mr. Havas is a National Director of the American Association of Engineers, and resides in Piedmont, California.

William Wallace Dies

We are sorry to report the death of William R. F. Wallace, veteran Arizona road building and retired U.S. Bureau of Public Roads engineer, in May. Mr. Wallace was a graduate civil engineer from Purdue and at the time of his retirement in April, 1952, had spent 32 years in road building in Arizona as assistant Arizona district engineer for the Bureau of Public Roads. He was a member of the Phoenix Chapter, A.A.E.

Engineering In The Tea Industry

By P. K. Thomas, Mechanical Assistant to the Chief Engineer
K.D.H.P. Company, Ltd. Kerala State, S. India, Member A.A.E.



P. K. Thomas

The largest single tea producing company in Kerala, and probably in the whole world, is Kanan Devan Hills Produce Company, and this article is based mainly on the experience gained in the engineering work done for this company.

Kerala derived its name from the word Kera, Sanskrit for coconut tree. In Kerala, coconut trees are abundant, and they are one of the sources of wealth of the country. From ancient times onward, Kerala was known as Malabar, from Dravidian, Mala, a hill, and Arabic, baar, a country, on the west coast of India. The land was rich in pepper, coconuts and their by-products and Lemon grass, timber, and fruits of many kinds, attracted merchants from all parts of the world. Throughout its early history, little or no mention was made of its mountainous range, which for generations towered above, safe and inaccessible. The early traders of this country little dreamed how new speculations would in time develop or how one

day tea would pour out through the ghats to the coastal ports in thousands of tons to flood the world's market and capture trade from China's monopoly.

The Kanan Devan Hills are part of the western ghats stretching from Bombay to Cape Comorin in the former Travancore State now in Kerala, South India. Kanan Devan Hills got their name from one Kannan-Thevar who was the Landlord of the Hills. Kanan Devan Hills, the present tea area, with an elevation of from 5000 to 8000 feet above M. S. L., came to be known from 1870, due to the great enterprise of European pioneer planters.

The Kanan Devan Hills Produce Company with its 29 estates covers an area of 214.37 square miles, spread out over the slopes and valleys of the high ranges of North Travancore in Kerala, South India. The beautiful green hills and valleys with many waterfalls are thickly wooded where they are not cleared for tea planting. The engineer plays an important part in the estates and his skill and ingenuity are required in the building and upkeep of buildings and roads, transport, hydro-electric power, and care of machinery in the manufacture of tea.

Very little is known to the tea world about the part played by engineering in the tea industry. The fact is that it is a vital factor in the production of quality tea. Important points are diagnosed below.

Roads and Buildings

Roads and buildings are the arteries of any prosperous agricultural industry. Adequate roads will be advantageous for inspection, harvesting of crops, and transport. It is the business of the engineer to see that good roads are strategically located; laid economically and maintained in good condition. Road construction in tea producing areas in different terrain is difficult and often involves a large number of protection works, culverts and bridges. The bridges vary from 10 foot to 150 foot spans constructed either with steel or concrete. Suspension bridges are not uncommon.

Buildings for factories and accommodation of labor and staff are in no way less important in the industry. In the design of the factory with steel or concrete in three or four floors, it is essential that the site selection be adjusted in such a way that the natural facilities of cheap power and convenience of withering are exploited to the maximum possible. Also, we have to bear in mind the layout of machinery in the factory to reduce handling to the minimum during the processing of leaf and transport of produce.

Cheap Power

This is one of the governing factors in the cost of production. If cheap power for motivation of machinery for manufacture is not obtained, the production cost will be high, resulting in loss to the producer and consumer alike.

As the tea industry is a dollar earning one, the government makes electricity available at reasonable cost. Where this cheap power is not available, alternative power from gas engines, diesel engines, or water power is used for motivation of machinery. The installation and maintenance of machinery to run throughout the year presents problems due to difficulty in obtaining spares.

Spares are costly and import restrictions handicap replacements. Local conditions for repairs are quite unfavorable in places like hills far from busy cities. Considering the cost of spares and impediments in getting them, maintenance is a challenge to engineers.

Almost all of the tea growing centers have heavy rainfall and abundant water. Utilization of flowing water in hills is the main source of power in the tea industry. Big concerns have set up their own power plants generating electricity by water power. Kanan Devan Hills Produce Company pioneered in the hydro-electric supply for their tea industry as far back as 1900. This gave incentive to the then Travancore State Government to start other hydro-electric projects, which are now increasing year by year in the Kerala State. Thanks to the pioneering skill, originality, and far-sightedness of Kanan Devan Hills Produce Company engineers, Kerala is now in the fore front of hydro-electric development in India.

Water Supply

A protected and purified water supply to the staff and labor presents a considerable expenditure, and regular maintenance of storage tanks constructed with cement, concrete, or steel was a headache to the engineers. The presence of acidity in water results in corrosion of steel and chemical decomposition of cement, making the storage tanks leak after a period of three or four years. As an experiment, clean cement plastering with rich mixture was applied to masonry tanks and after a lapse of three years it was seen that only sand particles were left. It was found that this chemical decomposition of cement was due to citric acid present in the water of tea growing areas.

Remedial measures were instituted and finally it was discovered that painting the cement masonry tanks and steel tanks inside with two or three coats of bitumastic paint was the answer to this acidic action problem.

Transport

Transport inside the state and for export of tea produced to the marketing centers is generally done by a fleet of trucks, and in certain cases by aerial ropeways. Servicing and repairs are carried out as and when necessary. Here again the spares are costly and are not readily available.

Processing of Tea

Engineering science has developed the machinery required for all processes. The main processes are: withering, rolling, fermenting, firing, and sorting.

Natural and artificial withering are adopted according to the climatic conditions of the season. In artificial withering, the green leaf is brought from the field and spread on specially prepared leaf tatts in enclosed houses and conditioned air is passed over the green leaf for withering. The optimum temperature is obtained by control measures. Here the machinery used is: one stove for producing heat, and one fan of adequate capacity for boosting air at the predetermined velocity and temperature through the lofts of the factory or withering house. The object of withering is to reduce a certain amount of water content from the green leaf.

After withering, the leaf undergoes rolling to break the cells of the leaf, spreading the juice on the surface to quicken oxidation. Here physical and chemical changes take place. Fermenting is carried out just to oxidize the juice ejected from the surface. Fermenting is carried out in humid places artificially controlled to get the required difference of temperature on the hygrometer.

Firing is done by scientific methods. Hot air at a predetermined temperature is passed through fermented leaf in a drying chamber and moisture is expelled. The fired tea (black stage) will have about one and a half to two and a half percent moisture content.

Sorting and Packing

Grading and packing of tea for marketing are done by sorting in sifter to suit foreign and local market conditions. All the manufacturing processes are done by machinery which requires extensive repairs to keep it going throughout the year.

Mechanized plucking of leaves from tea bushes is becoming common and is a boon to the industry, bringing down the labor force by fifty percent. There is research going on to take up the whole process of tea manufacturing as a continuous process by complete mechanization, which will be quite welcome in these days of labor unrest. Research is very essential for all industries, but only a few research stations are catering to this industry, and this requires expansion.

Research is now on toward the evolution of a process of continuity in manufacturing from withering to packing, and a continuous process is being perfected. This will bring down production costs and promote expediency in manufacturing.

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